

[illegible]

1. Scope:

This specification describes the thermal tests applied to 200 ohm voltage tap resistors used in RHIC magnets in order to induce failure in "weak" resistors prior to installation in magnets. Groups of 20 or more resistors can be tested together.

2. Applicable Documents:

The following documents of the issue in effect on the issue date of this procedure form a part of this procedure to the extent specified herein.

BNL Dwg. 12010190 Cold Mass (Electro/Mech.) Resistor

3. Requirements:

3.1 Equipment

- Wire markers
- High precision four wire ohmmeter (0.1% accuracy or better)
- Air circulated oven
- Liquid nitrogen bath
- Surface temperature probe (1⁰C accuracy) for room temperature measurements

3.2 Procedure

3.2.1 Tag each resistor with a wire marker that will uniquely identify each resistor.

3.2.2 With the group of resistors stabilized at room temperature, measure and record the surface temperature of one of the resistors. Using a high precision four wire ohmmeter measure the resistance of each resistor at room temperature. Record all measurements on the Data Sheet, sheet 3 of this procedure.

3.2.3 Place the group of resistors in an air circulated oven heated and stabilized to 100⁰C. Resistors are to remain in oven for 20 minutes.

3.2.4 Transfer the resistors immediately to a liquid nitrogen bath. The resistors are to remain in the bath for 5 minutes after the liquid nitrogen has stopped boiling.

3.2.5 Repeat steps 3.2.3 and 3.2.4 without allowing resistors to stabilize at room temperature.

- 3.2.6 Place the resistors immediately in the oven for 10 minutes at 100⁰C for a final high temperature soak.
- 3.2.7 Remove resistors from the oven and allow them to return to room temperature. This will require a period of at least 15 minutes.
- 3.2.8 Visually inspect each resistor for cracks, breaks or other defects. Reject and separate any defective resistors and indicate the type of failure on the Data Sheet.
- 3.2.9 Measure and record the surface temperature of several of the group of resistors and verify that the resistors are at room temperature within $\pm 5^0\text{C}$ of the initial room temperature reading.
- Remeasure resistance of each resistor as in step 3.2.2 and reject and separate any resistor that has changed resistance greater than $\pm 1\%$ (approximately $\pm 2\ \Omega$) from the initial value. Record results on the Data Sheet.
- 3.2.10 The resistors that have passed the above tests may be installed as voltage tap resistors. Each resistor shall retain it's unique wire markers as an indicator of passing this test.

The only official copy of this file is the one on-line on the Superconducting Magnet Division website. Before using a printed copy, verify that it is the most current version by checking the document issue date on the website.

RHIC-MAG-M-7403A

Page 3 of 3

DATA SHEET

Resistor Pre-Qualification Tests (Voltage Tap Resistors)

Room Temperature (Step 3.2.2) _____°C

Resistor Temperature (Step 3.2.9) _____°C

NO.	Room Temperature Resistance (Ω)		COMMENTS
	INITIAL	FINAL	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			

SK/S00331LR